

# Wachtershauser's Pop and Adapt

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*Source:* <http://sci.tech-archive.net/Archive/sci.bio.evolution/2006-02/msg00471.html>

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- *From:* [TomHendricks474@xxxxxx](mailto:TomHendricks474@xxxxxx)
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Here is Gunter Wachtershauser's 'Pop and Adapt' OOL scenario. He first pops up metabolism which 'runs on its own' until it can adapt. It has the same failings as all Pop and Adapt scenarios (Pops out of nothing, no regard for the environment, has a magic cloak to protect it from environmental damage until it can adapt to its environment, and it does this for no other reason than we need it to happen to get to life) Also note his "X taps of the chemical magic wand" that all these scenarios also seem to have.

[http://www.findarticles.com/p/articles/mi\\_m1200/is\\_2\\_155/ai\\_53630867](http://www.findarticles.com/p/articles/mi_m1200/is_2_155/ai_53630867)

"... In Wachtershauser's theory, the first organic molecule put together on the conveyor belt was acetic acid, a simple combination of carbon, hydrogen, and oxygen that is best known for giving vinegar its pungent odor. Formation of acetic acid is a primary step in metabolism, the series of chemical reactions that provides the energy that cells use to manufacture all the biological ingredients an organism needs.

According to the theory, metabolism came before all else. Once a primitive metabolism evolved, it began to run on its own, and only later were cells' other basic elements, such as a genetic code, invented.

Wachtershauser focuses on the heart of modern metabolism, the citric acid cycle. All living cells use this series of reactions to extract energy from food. The cycle makes changes in several chemical compounds, but it always begins with acetic acid. Inside a cell, the two carbon atoms in each acetic acid molecule are eventually expelled as carbon dioxide in a reaction that gives off a packet of energy.

Because the citric acid cycle is intrinsic to all modern life, Wachtershauser guesses that its basic reactions are close to the chemistry with which life began—with one significant variation. In the oxygen-deficient world at hydrothermal vents, heat-loving bacteria operate the cycle backward (SN: 3/29/97, p. 192). Instead of giving off carbon dioxide to make energy, they incorporate carbon atoms to build a

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succession of more complex organic molecules. Wachtershauser says life's first chemicals were built the same way.

Around the vents, he theorizes, catalytic metallic ions first enabled the materials around them to fashion acetic acid.

In the next step, the ions catalyzed the addition of a carbon molecule to the acetic acid to get three-carbon pyruvic acid, which is another key chemical in the citric acid cycle and also reacts with ammonia to form amino acids, which themselves link up to form proteins.